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### (54) Pressure swing adsorption process and apparatus

(57) A process and system for separating the components of a gas mixture by PSA in a four-vessel adsorption system operated as two pairs of adsorption vessels. The vessels of each pair are operated 180° out of phase, such that one vessel of a pair is in the adsorption mode while the other vessel of the pair is undergoing adsorbent regeneration. The apparatus includes the two pairs of adsorption vessels, typically an intermediate gas storage reservoir which is used to temporarily

store gas removed from the non-adsorbed gas outlet end of the adsorption vessels for use in various steps of the process, one gas blower and a pair of vacuum pumps. The adsorption cycle is such that the pairs of adsorption vessels are operated out of phase relative to each other and the blower and both vacuum pumps can be in continuous operation throughout the process. The process and system are particularly well adapted to the separation of nitrogen from oxygen by vacuum swing adsorption.

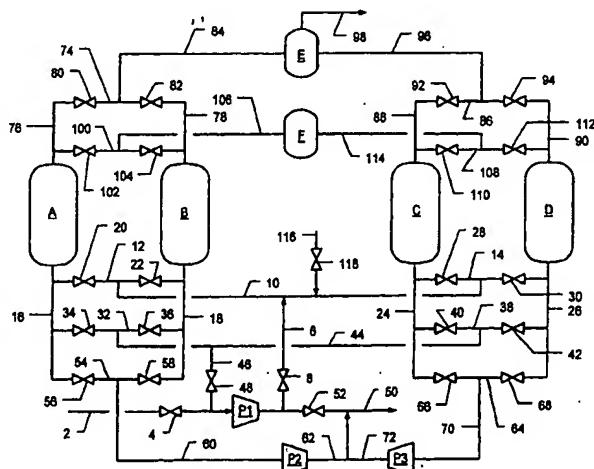


FIG. 1



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## EUROPEAN SEARCH REPORT

Application Number

EP 99 30 5730

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
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<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>7 July 2000</td> <td>Doolan, G</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	7 July 2000	Doolan, G
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THE HAGUE	7 July 2000	Doolan, G							
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; vertical-align: top;">           X : particularly relevant if taken alone            Y : particularly relevant if combined with another document of the same category            A : technological background            O : non-written disclosure            P : intermediate document         </td> <td style="width: 33%; vertical-align: top;">           T : theory or principle underlying the invention            E : earlier patent document, but published on, or after the filing date            D : document cited in the application            L : document cited for other reasons            .....            &amp; : member of the same patent family, corresponding document         </td> </tr> </table>				X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document				
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